The present invention discloses a salvaging head for a petroleum instrument salvaging system, which comprises: a lifting part, for connecting a lifting rope; an insertion rod, which is located under the lifting part and used for protruding into a stair-shaped salvaging hole, and is set with a notch on both sides of the free end thereof; two clamping pieces, which are respectively hinged in two notches, and the clamping face thereof can be in hooking fit with a hooking face in the horizontal plane, wherein the hinge part of the two clamping pieces is located on one end thereof, and the other end is set with a pulling rope, wherein the pulling rope is strained gradually as the clamping face rotates to the horizontal plane, and the orientations of the other ends, which are connected with the pulling rope, of the two clamping pieces are opposite to each other; a compression spring, which is set between the other end of each clamping piece and the sidewall of the corresponding notch, for applying a restoring force that makes the clamping face of the clamping piece in the horizontal plane. The invention further discloses a petroleum instrument salvaging system. By the above solutions, the current problems of large labor intensity, low efficiency, high cost and large economic loss caused by salvaging a petroleum instrument via pulling drill rods out of the drilling well can be solved.
PETROLEUM INSTRUMENT SALVAGING SYSTEM AND SALVAGING HEAD

FIELD OF THE INVENTION

[0001] The present invention relates to the field of petroleum instrument salvaging technologies, and in particular, to a petroleum instrument salvaging system and a salvaging head.

BACKGROUND OF THE INVENTION

[0002] During petroleum drilling, as the drill rod of a drilling device strikes into the earth gradually, a petroleum instrument (for example, inclinometer) set in the chamber of the drill rod will transmit the detected data to the ground successively, thereby the subsequent processing on the detected data may be realized by a ground device. As the drilling depth increases gradually, the position of the petroleum instrument will be deeper and deeper. It is known that the environment inside a drilling well is severe and it is harmful to the petroleum instrument. Therefore, it often occurs that the petroleum instrument is damaged; correspondingly, it also often occurs that the petroleum instrument is examined and repaired or replaced.

[0003] Generally, the petroleum instrument is freely placed on a base in the chamber of the drill rod for easy assembly and disassembly. At present, once the petroleum instrument is damaged, it will be required that the drill rods should be pulled out of the drilling well, that is, the drill rods should be salvaged one by one, until the drill rod in which the petroleum instrument exists is salvaged, and then the petroleum instrument is replaced or examined and repaired. In such a mode of replacing or examining and repairing the petroleum instrument, each drill rod needs to be raised to the ground for disassembly, thus problems of large labor intensity and low efficiency, etc., will be caused. Moreover, drilling must be stopped when the drill rods are pulled out of the drilling well, thus the drilling progress will be delayed, and at the same time, the cost for replacing or examining and repairing the petroleum instrument will be added. For users with a drilling progress task, the economic loss caused by pulling drill rods out of the drilling well will be greater. For example, at present, one subsegment of the drill rod is 10 m long, and three 10 m subsegments form one macrosegment, and several macros segments form the whole drill rod. When the petroleum instrument is made at a position of 3000 m by drilling the drill rod, if it is damaged, 100 macros segments of drill rods need to be successively salvaged and disassembled during pulling drill rods out of the drilling well, and this will at least cost 2-3 days, and manual work is required to disassemble the drill rods. For important drilling, it goes without saying that a huge economic loss will be caused by examining and repairing or replacing the petroleum instrument via pulling drill rods out of the drilling well.

SUMMARY OF THE INVENTION

[0004] In one aspect of the invention, there provides a salvaging head for a petroleum instrument salvaging system, thereby solving the current problems of large labor intensity, low efficiency, high cost and large economic loss caused by replacing or examining and repairing a petroleum instrument via pulling drill rods out of the drilling well.

[0005] In order to solve the above technical problems, the invention provides the following technical solution:

[0006] A salvaging head for a petroleum instrument salvaging system, which is used for the salvaging of a petroleum instrument, wherein the petroleum instrument has a stair-shaped salvaging hole, and the stair face of the stair-shaped salvaging hole is a hooking face; the salvaging head includes:

[0007] a lifting part, for connecting a lifting rope;

[0008] an insertion rod, which is located under the lifting part and used for protruding into the stair-shaped salvaging hole, and is set with a notch on both sides of the free end thereof;

[0009] two clamping pieces, which are respectively hinged in the two notches, and the clamping face can be in hooking fit with the hooking face in the horizontal plane, and the hinge part of the two clamping pieces is located on one end thereof, and the other end is set with a pulling rope, wherein the pulling rope is strained gradually as the clamping face rotates to the horizontal plane, and the orientations of the other ends, which are connected with the pulling rope, of the two clamping pieces are opposite to each other;

[0010] a compression spring, which is set between the other end of each clamping piece and the sidewall of the corresponding notch, for applying a restoring force that makes the clamping face of the clamping piece in the horizontal plane.

[0011] Preferably, in the above salvaging head, an intermediate jointing part is further included between the lifting part and the insertion rod;

[0012] the cross-sectional areas of the lifting part, the intermediate jointing part and the insertion rod decrease gradually to form a stair-shaped structure.

[0013] Preferably, in the above salvaging head, the lifting part, the intermediate jointing part and the insertion rod form an integral structure.

[0014] Preferably, in the above salvaging head, the intermediate jointing part is set with a first through hole and second through hole, and the first through hole and the second through hole intersect with each other;

[0015] the first through hole is set with a cross rod that traverses the intermediate jointing part, the pulling rope passes through the openings of the second through hole that are located on the same side and is connected fixedly with the cross rod, and the cross rod can be in stopping fit with the entrance end of the stair-shaped salvaging hole.

[0016] Preferably, in the above salvaging head, the sidewall of the notch is set with a through hole that extends to the surface of the insertion rod, and one end of the pulling rope, which is connected with the clamping piece, passes through the through hole.

[0017] Preferably, in the above salvaging head, the free end of the insertion rod has a conform insertion head.

[0018] Preferably, in the above salvaging head, the surface of the lifting part is set with a plurality of crash-proof strips that are distributed circumferentially;

[0019] the two ends of the crash-proof strip are fixed on the lifting part, and the part of the crash-proof strip, which is located between the two ends thereof, and the surface of the lifting part form a buffer clearance.

[0020] Preferably, in the above salvaging head, the crash-proof strip is a beryllium copper crash-proof strip.

[0021] In another aspect of the invention, there further provides a petroleum instrument salvaging system. The petroleum instrument salvaging system provided includes a rope winder, a lifting rope and a salvaging head; wherein, one end of the lifting rope is wound on the rope winder, and the other end is connected with the salvaging head; and
the salvaging head is any one of the above salvaging heads.

Preferably, in the above petroleum instrument salvaging system, the lifting rope is a nylon rope.

The operation of the salvaging head according to the invention is as follows: the lifting rope lowers the whole salvaging head along the chamber of the drill rod to the petroleum instrument, the insertion rod protrudes into the stair-shaped salvaging hole of the petroleum instrument, and when the clamping pieces do not enter the hole section of the stair-shaped salvaging hole that has a large diameter, the clamping faces of the clamping pieces will be in the horizontal plane under the action of the corresponding compression spring thereof; when the clamping pieces enter the hole section of the stair-shaped salvaging hole that has a small diameter, the hole section that has a small diameter will act on the clamping pieces, thereby the two clamping pieces are made to rotate to the direction in which the compression spring is pressed, so that the external dimension of the clamping pieces will be reduced, and thus the clamping pieces will pass through the hole section that has a small diameter. When the clamping pieces enter the hole section that has a large diameter, the clamping pieces will no longer be constrained by the hole section that has a small diameter; and the clamping faces of the two clamping pieces will again be in the horizontal plane under the action of the corresponding compression spring. At this time, the salvaging head moves under the action of the lifting rope, the clamping pieces and the clamping faces of the clamping pieces can be in hooking fit with the hooking face of the stair-shaped salvaging hole, and finally the whole petroleum instrument is lifted to the ground together with the salvaging head, thereby the salvaging of the petroleum instrument can be realized.

It may be known from the description of the above operation that, in comparison with the background technology, when a petroleum instrument is damaged, the salvaging of the petroleum instrument can be realized by employing the salvaging head according to the invention, rather than salvaging the petroleum instrument in the current mode of pulling drill rods out of the drilling well. In comparison with the mode of pulling drill rods out of the drilling well, by employing the salvaging head according to the embodiment of the invention, it can be avoided that the drill rods are salvaged and disassembled one by one, thus the efficiency can be improved, and at the same time, the labor intensity and the cost can be lowered, and the economic loss caused by stopping drilling can also be lowered. Therefore, the salvaging head according to the embodiment of the invention has a good market application prospect in the field of petroleum drilling.

FIG. 3 is a partial cut-away view of FIG. 2 at another visual angle;

FIG. 4 is another structural representation of the salvaging head for a petroleum instrument salvaging system according to one embodiment of the invention; and

FIG. 5 is a structural representation of a petroleum instrument salvaging system according to one embodiment of the invention.

In the above FIG. 1-FIG. 5:

Petroleum Instrument 1, Salvaging Head 2, Rope Winder 3, Lifting Rope 4, Pulley Block 5, Drilling Well 6.


DETAILED DESCRIPTION OF THE EMBODIMENTS

The embodiments of the invention provide a salvaging head for a petroleum instrument salvaging system, thereby solving the current problems of large labor intensity, low efficiency, high cost high cost and large economic loss due to stopping drilling, which are caused by replacing or examining and repairing a petroleum instrument via pulling drill rods out of the drilling well.

In order to make one skilled in the art better understand the technical solutions in the embodiments of the invention and to make the above objects, characteristics and advantages of the embodiments of the invention more apparent, the technical solutions in the embodiments of the invention will be further illustrated in detail in conjunction with the drawings.

Referring to FIGS. 1-3, one embodiment of the invention provides a salvaging head 2 for a petroleum instrument salvaging system, and the salvaging head 2 provided is used for the salvaging of a petroleum instrument 1. The petroleum instrument 1 has a stair-shaped salvaging hole 11, which is generally located on the top of the petroleum instrument 1 to realize the subsequent hoisting and salvaging. The stair face of the stair-shaped salvaging hole 11 is a hooking face 112, that is, the hole section of the stair-shaped salvaging hole 11 that has a small diameter is located at a top opening of the petroleum instrument 1, the hole section that has a large diameter is located under the top opening, and the hooking face 112 faces the bottom of the hole section that has a large diameter. The salvaging head 2 according to the embodiment of the invention includes a lifting part 21, an insertion rod 22, two clamping pieces (clamping piece 28, clamping piece 210), two pulling ropes (pulling rope 25, pulling rope 24) and two compression springs (one of which is compression spring 27, and the other of which is not shown).

Wherein, the lifting part 21 is a part of the whole salvaging head 2 that is connected with a lifting rope of a petroleum instrument salvaging system, and the lifting part 21 drives the whole salvaging head 2 to rise and fall under the pulling of the lifting rope. Generally, the lifting part 21 has a cylindrical structure; however, the specific shape of the lifting part 21 is not limited in the embodiment of the invention, and
the lifting part 21 may have various shapes so long as it guarantees that the lifting part 21 can rise and fall in the chamber of the drill rod.

[0039] The insertion rod 22 is located under the lifting part 21, and it is used for protruding into the stair-shaped salvaging hole 11. Generally, the insertion rod 22 has a cylindrical structure. When the insertion rod 22 and the lifting part 21 both have a cylindrical structure, it is preferred that the insertion rod 22 and the lifting part 21 are arranged coaxially. The insertion rod 22 and the lifting part 21 may be connected by an additional intermediate connecting piece, or they may form an integral structure. It should be noted that, in the embodiment of the invention, the insertion rod 22 is adopted to protrude into the stair-shaped salvaging hole 11 so as to realize the hooking fit with the hooking face 112 of the stair-shaped salvaging hole 11, thus the insertion rod 22 needs to have an enough length, and one skilled in the art may adaptively adjust and design the length of the insertion rod 22 according to the type and size of the petroleum instrument 1, which will not be limited in the embodiments of the invention. In the embodiment of the invention, a notch is set in both sides of the free end of the insertion rod 22 (one of which is notch 26, and the other of which is not shown).

[0040] The two clamping pieces are respectively a clamping piece 28 and a clamping piece 210. The clamping piece 28 is hinged in the notch 26, and the clamping piece 210 is hinged in a notch on the other side of the free end of the insertion rod 22 (not shown). The hinge part of the clamping piece 28 is located on one end thereof, and the other end is set with a pulling rope 25. One end of the pulling rope 25 is connected with the other end of the clamping piece 28, and the other end of the pulling rope 25 is fixed on the top of the clamping piece 28, and the pulling rope 25 can be gradually in a strained state as a clamping face 281 of the clamping piece 28 rotates to the horizontal plane. Similarly, the hinge part of the clamping piece 210 is located on one end thereof, and the other end is set with a pulling rope 24. One end of the pulling rope 24 is connected with the other end of the clamping piece 28, and the other end of the pulling rope 24 is fixed on the top of the clamping piece 210. The pulling rope 25 can be gradually in a strained state as a clamping face 2101 of the clamping piece 210 rotates to the horizontal plane. It should be noted that, the clamping face 281 of the clamping piece 28 and the clamping face 2101 of the clamping piece 210 can be in hooking fit with the hooking face 112 when they are in the horizontal plane, so that the hooking of the salvaging head 2 and the petroleum instrument 1 is realized. Preferably, the orientations of the ends, which are connected with the pulling rope respectively, of the clamping piece 28 and the clamping piece 210 are opposite to each other; with such a structure, the clamping piece 28 and the clamping piece 210 can be made to hook two opposite parts of the hooking face 112 respectively, thereby it can guarantee more reliable hooking. Preferably, the clamping piece 28 and the clamping piece 210 are hinged in the corresponding notch thereof by one and the same jointed shaft that is set on the free end of the insertion rod 22, which is convenient for the assembling of the device.

[0041] There exist two compression springs (one of which is compression spring 27, and the other of which is not shown), wherein the compression spring 27 is set between the other end of the clamping piece 28 and the sidewall of the notch 26, for applying a restoring force that makes the clamping face of the clamping piece 28 be in the horizontal plane. The other compression spring is set between the other end of the clamping piece 210 and the sidewall of the other notch, for applying a restoring force that makes the clamping face 2101 of the clamping piece 210 be in the horizontal plane.

[0042] The operation of the salvaging head 2 according to the embodiment of the invention is as follows: the lifting rope lowers the whole salvaging head 2 along the chamber of the drill rod to the petroleum instrument 1, the insertion rod 22 protrudes into the stair-shaped salvaging hole 11 of the petroleum instrument 1, and when the clamping piece 28 and the clamping piece 210 do not enter the hole section of the stair-shaped salvaging hole 11 that has a large diameter, the clamping face 281 of the clamping piece 28 and the clamping face 2101 of the clamping piece 210 will be in the horizontal plane under the action of the corresponding compression spring thereof; when the clamping pieces enter the hole section of the stair-shaped salvaging hole 11 that has a small diameter, the hole section that has a small diameter will act on the clamping piece 28 and the clamping piece 210, thereby the clamping piece 28 and the clamping piece 210 are made to rotate to the direction in which the compression spring is pressed, so that the external dimension of the clamping piece 28 and the clamping piece 210 will be reduced, and thus the clamping pieces will pass through the hole section that has a small diameter. When the clamping pieces enter the hole section that has a large diameter, the clamping piece 28 and the clamping piece 210 will no longer be constrained by the hole section that has a small diameter, and the clamping faces of the two clamping pieces will again be in the horizontal plane under the action of the corresponding compression spring. At this time, the salvaging head 2 moves under the action of the lifting rope, the clamping pieces of the clamping piece 28 and the clamping piece 210 can be in hooking fit with the hooking face 112 of the stair-shaped salvaging hole 11, and finally the whole petroleum instrument 1 is lifted to the ground together with the salvaging head 2, thereby the salvaging of the petroleum instrument 1 can be realized.

[0043] It may be known from the description of the above operation that, in comparison with the background technology, when the petroleum instrument 1 is damaged, the salvaging of the petroleum instrument 1 can be realized by employing the salvaging head 2 according to the invention, rather than salvaging the petroleum instrument in the current mode of pulling drill rods out of the drilling well. In comparison with the mode of pulling drill rods out of the drilling well, by employing the salvaging head according to the embodiment of the invention, it can be avoided that the drill rods are salvaged and disassembled one by one, thus the efficiency can be improved, and at the same time, the labor intensity and the cost can be lowered, and the economic loss caused by stopping drilling can also be lowered. Similarly, for the scene in the background technology, at present, one subsegment of the drill rod is 10 m long, and three 10 m subsegments form one macrosegment, and several macrosegments form the whole drill rod. When the petroleum instrument 1 is made at a position of 3000 m underground by drilling the drill rod, if the petroleum instrument 1 is damaged, salvaging may be completed in 2-3 hours by employing the salvaging head 2 according to the embodiment of the invention, the manpower consumed in this process is reduced, and the labor intensity is also lowered. Thus it can be seen that, the salvaging head 2 according to the embodiment of the invention has a good market application prospect in the field of petroleum drilling.

[0044] Referring to FIGS. 1, 2 or 3, in the salvaging head 2 according to the embodiment of the invention, an intermedi-
The jointing part 29 is further included between the lifting part 21 and the insertion rod 22. Wherein, the cross sections of the lifting part 21, the intermediate jointing part 29 and the insertion rod 22 decrease gradually to form a stair-shaped structure. The stair-shaped structure can improve the working sensitivity of the salvaging head 2.

In the embodiment of the invention, the pulling rope 25 and the pulling rope 24 may be fixed on the salvaging head 2 in various modes. For example, the pulling rope 25 and the pulling rope 24 may be directly hooked on the lifting part 21, the insertion rod 22 or the intermediate jointing part 29. Referring again to FIGS. 1, 2 or 3, the intermediate jointing part 29 is set with a first through hole 291 and a second through hole 292, which intersect with each other. The first through hole 291 is set with a cross rod 23 that traverses the intermediate jointing part 29, and the pulling rope 25 and the pulling rope 24 pass through the openings of the second through hole 292 that are located on the same side, and they are connected fixedly with the cross rod 23. More preferably, the length of the cross rod 23 is greater than the entrance width of the stair-shaped salvaging hole 11 for the purpose of being in stopping fit with the entrance end of the stair-shaped salvaging hole 11. The stopping fit of the cross rod 23 with the entrance end of the stair-shaped salvaging hole 11 can prevent, under the premise of guaranteeing that the clamping piece 28 and the clamping piece 210 can enter the hole section of the stair-shaped salvaging hole 11 that has a large diameter, the insertion rod 22 from further protruding into a deeper part of the stair-shaped salvaging hole 11; finally, unnecessary operation can be avoided, and salvaging time can be saved. Preferably, the above first through hole 291 and second through hole 292 are strip-shaped holes extending along the axial direction of the lifting part 21, the insertion rod 22 or the intermediate jointing part 29, and the cross rod 23 is in sliding fit with the second through hole 292; during the process in which the insertion rod 22 of the whole salvaging head 2 is inserted into the stair-shaped salvaging hole 11, the cross rod 23 slides as interfered by the petroleum instrument 1, and finally it will be in stopping fit with the stair-shaped salvaging hole 11 on the top of the second through hole 292. The cross rod 23 can slide in the length direction of the second through hole 292, thus the length of the whole salvaging head 2 that enters into the stair-shaped salvaging hole 11 can be changed, thereby the salvaging head 2 will be able to adapt stair-shaped salvaging holes 11 with different depths.

In a preferred solution, the sidewalls of the two notches are both set with a through hole that extends to the surface of the insertion rod 22 (one of which is a through hole 221, and the other of which is not shown), the end of the pulling rope 25 that is connected with the clamping piece 28 passes through the through hole 221, and the end of the pulling rope 24 that is connected with the clamping piece 210 passes through the through hole (not shown). With the setting of the above through holes, the corresponding pulling rope can be arranged via the insertion rod 22, and this can further reduce the arrangement space of the pulling rope.

The insertion rod 22 is used for inserting into the stair-shaped salvaging hole 11. The accurate and fast insertion of the insertion rod 22 is an important assurance to the salvaging efficiency. Therefore, in the embodiment of the invention, the free end, i.e., the insertion end, of the insertion rod 22 has a coniform insertion head 222. However, the entrance of the stair-shaped salvaging hole 11 may be designed as a coniform opening 111 for accurately and rapidly inserting the insertion rod 22.

During the salvaging of the petroleum instrument 1, the lifting rope of the petroleum instrument salvaging system drives the whole salvaging head 2 to rise and fall along the chamber of the drill rod, and in this process, the salvaging head 2 may swing and thus impact the drill rod, which tends to damage the drill rod. In order to solve this problem, in the salvaging head 2 according to the embodiment of the invention, a plurality of crash-proof strips 211 that are distributed circumferentially are set on the surface of the lifting part 21, and preferably, the crash-proof strips 211 are elastic strips so as to attain the object of damping and lowering the impact force. Specifically, the two ends of the crash-proof strips 211 are fixed on the lifting part 21, and the part of the crash-proof strip 211, which is located between the two ends thereof, and the surface of the lifting part 21 forms a buffer clearance 212 so as to attain the object of damping. Additionally, during impacting, the collision between the salvaging head 2 and the inner wall of the chamber of the drill rod tends to generate sparks, which is a severe hidden danger to petroleum drilling. Therefore, the crash-proof strip 211 according to the embodiment of the invention is a beryllium copper crash-proof strip, which is made of a beryllium copper material and has good flame resistance, thereby hidden danger may be lowered.

Based on the salvaging head according to the embodiment of the invention, one embodiment of the invention further provides a petroleum instrument salvaging system. Referring to FIG. 5, the petroleum instrument salvaging system provided includes a rope winder 3, a lifting rope 4 and a salvaging head 2, wherein, one end of the lifting rope 4 is wound on the rope winder 3, and the other end is connected with the salvaging head 2, thereby the salvaging head 2 can rise and fall in the drilling well 6. Wherein, the salvaging head 2 is the salvaging head 2 according to any one of the above embodiments. Generally, the strike direction of the lifting rope 4 is changed via a pulley block 5, thereby the winder 3 may work at different arrangement positions.

During salvaging, the lifting rope 4 drives the salvaging head 2 to rise and fall. Generally, the lifting rope 4 is a steel wire rope; however, the steel wire rope may be knotted, and the fatigue caused by knotting tends to make the lifting rope 4 broken. Once the lifting rope 4 is broken, severe damage will be caused to the drilling device. Therefore, the lifting rope 4 according to the embodiment of the invention is preferably a flexible lifting rope, for example, a nylon rope. The flexible lifting rope has a high strength and a strong flexibility, and it will not be knotted during lifting, thereby the probability that the lifting rope 4 is broken can be lowered. The flexible lifting rope is generally made of a material with high strength and good abrasion resistance, and the specific material of the lifting rope 4 is not limited in the embodiments of the invention.

It should be noted that, the salvaging head and the petroleum instrument salvaging system according to the embodiments of the invention may also be applicable for the salvaging of an instrument under a drilling well during a drilling process of other fields, for example, coal drilling, etc., rather than being limited to the field of petroleum.

Each embodiment in this specification is described in a stepped mode, and reference may be made to each other for the same or similar parts among the embodiments. Each embodiment emphasizes a different part from other embodiments.
The above embodiments of the invention will not limit the protection scope of the invention. Any modifications, equivalent substitutions and improvements without departing from the spirit and principle of the invention will fall into the protection scope of the invention.

1. A salvaging head (2) for a petroleum instrument salvaging system, which is used for the salvaging of a petroleum instrument (1), wherein the petroleum instrument (1) has a stair-shaped salvaging hole (11), and the stair face of the stair-shaped salvaging hole (11) is a hooking face (112); wherein, the salvaging head comprises:
   - a lifting part (21), for connecting a lifting rope (22), which is located under the lifting part (21) and used for protruding into the stair-shaped salvaging hole (11), and is set with a notch (26) on both sides of the free end thereof;
   - two clamping pieces (28, 210), which are respectively hinged in the two notches (26), and the clamping face can be in hooking fit with the hooking face (112) in the horizontal plane, and the hinge part of the two clamping pieces (28, 210) is located on one end thereof, and the other end is set with a pulling rope (25, 24), wherein the pulling rope (25 or 24) is strained gradually as the clamping face (281) rotates to the horizontal plane, and the orientations of the other ends, which are connected with the pulling rope (25 or 24), of the two clamping pieces (28, 210) are opposite to each other; and
   - a compression spring (27), which are set between the other end of each clamping piece (28 or 210) and the sidewall of the corresponding notch (26), for applying a restoring force that makes the clamping face (281) of the clamping piece (28 or 210) in the horizontal plane.

2. The salvaging head (2) according to claim 1, wherein, an intermediate jointing part (29) is further included between the lifting part (21) and the insertion rod (22); and
   - the cross-sectional areas of the lifting part (21), the intermediate jointing part (29) and the insertion rod (22) decreases gradually to form a stair-shaped structure.

3. The salvaging head (2) according to claim 2, wherein, the lifting part (21), the intermediate jointing part (29) and the insertion rod (22) form an integral structure.

4. The salvaging head (2) according to claim 2 or 3, wherein, the intermediate jointing part (29) is set with a first through hole (291) and a second through hole (292), and the first through hole (291) is set with a cross rod (23) that traverses the intermediate jointing part (29), and the pulling rope (25 or 24) passes through the openings of the second through hole (292) that are located on the same side and is connected fixedly with the cross rod (23), and the cross rod (23) can be in stopping fit with the entrance end of the stair-shaped salvaging hole (11).

5. The salvaging head (2) according to claim 1, wherein, the sidewall of the notch (26) is set with a through hole (221) that extends to the surface of the insertion rod (22), and one end of the pulling rope (25 or 24) that is connected with the clamping piece (28 or 210) passes through the through hole (221).

6. The salvaging head (2) according to claim 1, 2, 3 or 5, wherein, the free end of the insertion rod (22) has a coniform insertion head (222).

7. The salvaging head (2) according to claim 1, wherein, the surface of the lifting part (21) is set with a plurality of crash-proof strips (211) that are distributed circumferentially;
   - the two ends of the crash-proof strip (211) are fixed on the lifting part (21), and the part of the crash-proof strip (211), which is located between the two ends thereof, and the surface of the lifting part (21) form a buffer clearance (212).

8. The salvaging head (2) according to claim 7, wherein, the crash-proof strip (211) is a beryllium copper crash-proof strip.

9. A petroleum instrument salvaging system, comprising:
   - a rope winder (3), a lifting rope (4) and a salvaging head (2); wherein, one end of the lifting rope (4) is wound on the rope winder (3), and the other end is connected with the salvaging head (2); wherein:
     - the salvaging head (2) is the salvaging head (2) according to any one of the above claim 1-3, 5, or 7.

10. A petroleum instrument salvaging system, comprising:
    - a rope winder (3), a lifting rope (4) and a salvaging head (2); wherein, one end of the lifting rope (4) is wound on the rope winder (3), and the other end is connected with the salvaging head (2); wherein:
     - the salvaging head (2) is the salvaging head (2) according to any one of the above claim 1-3, 5, or 7, and further wherein, the lifting rope (4) is a nylon rope.

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